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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,726	07/25/2003	Shigeru Nishio	100353-00170	2370

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ARENT FOX PLLC
1050 CONNECTICUT AVENUE, N.W.
SUITE 400
WASHINGTON, DC 20036

EXAMINER	
TRAN, NHAN T	
ART UNIT	**PAPER NUMBER**
2622	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/626,726	NISHIO ET AL.	
	Examiner	Art Unit	
	Nhan T. Tran	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/25/2003 & 3/6/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) *3 and 4* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 5-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species II, Fig. 4, claims 1, 2, 5-11 in the reply filed on 3/6/2007 is acknowledged. Accordingly, claims 3 & 4 are withdrawn from consideration.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 7/25/2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 5-8 & 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amano et al. (US 6,909,813) in view of Kawakami et al. (US 5,331,411).

Regarding claim 1, Amano discloses a circuit (Fig. 1), comprising:

a differential calculating unit (gradient detecting circuit 22, details shown in Fig. 4) which obtains a differential between a value of a pixel of interest (i.e., S[0]) and values of surrounding pixels (i.e., S[-4] – S[+4]) contained in an image signal; a dead-zone generating unit (contour detecting circuit 2) which defines a predetermined range of pixel values (threshold values +TH and –TH shown in Fig. 6; col. 6, lines 19-57 and col. 7, lines 29-57); and a comparison unit (Fig. 4) checks whether the differential falls outside the predetermined range (greater than +TH or less than -TH), wherein contour enhancement is applied to the pixel of interest in response to a determination by the comparison unit that the differential falls outside the predetermined range (see Figs. 1-13 and col. 5, line 55 – col. 10, line 41, wherein the contour enhancement is applied to the target pixel if the comparison of differential value is outside of the range indicated by contour component and Maximum/Minimum values; otherwise, no enhancement is performed and original pixel is maintained).

Amano is silent about that the circuit is a semiconductor integrated circuit and the image signal is supplied from an image sensor. However, Kawakami teaches a video camera comprises an image sensor (Fig. 1A; col. 3, lines 60-67) that outputs an image signal to a single integrated image processing chip (30) for

performing contour enhancement (by block 11 shown in Figs. 1A and 9) on the image signal in addition to other processing operations so as to reduce size of signal processing in a video camera (see col. 1, lines 59-68; col. 4, line 40 and col. 15, lines 55-65).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Amano and Kawakami to construct a video camera having an image sensor for outputting an image signal which would be then processed by a single integrated semiconductor chip to perform necessary image processing operations including contour enhancement while reducing the size of the signal processing circuit into a single chip, thereby providing a compact camera.

Regarding claim 2, Amano in view of Kawakami also discloses a enhancement value generating unit (correction value calculation circuit 3 in to addition to clipping circuit 4) which obtains an enhancement value based on differentials between the value of the pixel of interest and the values of the surrounding pixels (from contour detecting circuit 2), said enhancement value generating unit adding (by adder 31b) the enhancement value to the value of the pixel of interest in response to the determination by the comparison unit that the differential falls outside the predetermined range (see Figs. 1-13 and col. 8, line 25 – col. 10, line 41).

Regarding claim 5, although Amano teaches the differential calculating unit to obtain the differential as discussed in claim 1, Amano does not explicitly disclose a luminance signal generating unit which obtains a luminance component from a plurality of color components of the image signal, and said differential calculating unit obtains the differential by using only the luminance component. However, such lack of teaching is compensated by Kawakami. As shown by Kawakami in Fig. 1A, col. 4, lines 64-68 and col. 6, lines 65-68, a luminance signal generating unit (6) generates luminance signal (Y) from a plurality of color components (R, G, B color components of color filters of image sensor shown in Fig. 2A-2C, col. 3. lines 60-67) of the image signal. The luminance signal is then output to the contour enhancement circuit (11) for calculating and enhancing the contour of the image (Figs. 1A & 9; col. 15, line 55 – col. 16, line 47).

Therefore, it would have been obvious to one of ordinary skill in the art to further modify the circuit of Amano in view of the teaching of Kawakami to provide a luminance signal generating unit which would obtain a luminance component from a plurality of color components of the image signal, and the differential calculating unit would obtain the differential by using only the luminance component so as to improve the contour enhancement since human's eyes are sensitive to luminance.

Regarding claim 6, the limitations of this claim are also met by the combined teachings of Amano and Kawakami as analyzed in claims 1 & 5.

Regarding claim 7, Amano in view of Kawakami analyzed in claims 1 & 5 also discloses that said differential calculating unit obtains a difference between the value of the pixel of interest and an average of the values of the surrounding pixels as said differential (see Kawakami, col. 13, lines 1-7).

Regarding claim 8, Amano in view of Kawakami further discloses that said differential calculating unit obtains a difference between the value of the pixel of interest and a value of an adjacent pixel with respect to each of four neighboring pixels (Fig. 6 of Amano) as said differential, and the comparison unit checks whether the differential falls within the predetermined range with respect to each of the four neighboring pixels (see Amano, col. 7, line 29 – col. 8, line 23; it should be noted that the difference between the value of the target pixel and the neighboring pixel values is directly or indirectly obtained, wherein the neighboring 8 pixels encompass the claimed 4 pixels).

Regarding claim 11, this method claim is also met by the analysis of the circuit claim 1.

5. Claims 9 & 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amano et al. and Kawakami et al. as applied to claim 8 and in further view of Hamada et al. (US 6,915,023).

Regarding claim 9, Amano and Kawakami do not explicitly teach that said enhancement value generating unit selects a differential having a largest absolute value among each said differential corresponding to the four neighboring pixels, and performs said contour enhancement in response to size of the differential having the largest absolute value.

As taught by Hamada, a contour correction device is constructed such that a differential having a largest absolute value (Fig. 2, blocks 2c and 2d) among each of differential values corresponding to neighboring pixels (Fig. 4), and performs contour enhancement in response to size of the differential having the largest absolute value (maximum absolute value detected), thereby improving contrast and the gradation of oblique lines in oblique directions (see Hamada, col. 1, line 65 – col. 2, line 5; col. 4, lines 40-54 and col. 6, lines 54-58).

Therefore, it would have been obvious to one of ordinary skill in the art to further reconfigure the contour enhancement circuit in Amano and Kawakami in view of teaching of Hamada to arrive at the Applicant's claimed invention so as to improve the contrast and the gradation of oblique lines in oblique directions.

Regarding claim 10, it is also clear in the combined teachings of Amano, Kawakami and Hamada that said contour enhancement is not performed if an absolute value of a largest one of each said differential corresponding to the four neighboring pixels is identical (flat field, no edge/contour is detected) to an absolute value of a smallest one of each said differential corresponding to the four neighboring pixels (see Hamada, col. 4, lines 64-67 and col. 6, lines 54-58).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (571) 272-7371. The examiner can normally be reached on Monday - Friday, 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NHAN T. TRAN
Patent Examiner